

**GREENWICH COVE**

**CONNECTICUT**

**SURVEY**



**CORPS OF ENGINEERS, U. S. ARMY  
OFFICE OF THE DIVISION ENGINEER  
NEW ENGLAND DIVISION, BOSTON, MASS.**

**JUNE 26, 1956**

**23**

*Top Greenwich Cove Cove*

NOT FOR PUBLIC RELEASE

SURVEY

GREENWICH COVE,  
CONNECTICUT

SYLLABUS

The Division Engineer finds that although a navigation improvement at Greenwich Cove, Connecticut to provide a 30-acre anchorage 6 feet deep for recreational craft is economically justified, local interests do not desire to provide the necessary requirements of local cooperation, in particular the provision of public access to the anchorage and the assurance of a local cash contribution. He therefore recommends that no Federal navigation project be authorized at this time.

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CORPS OF ENGINEERS, U. S. ARMY  
OFFICE OF THE DIVISION ENGINEER  
NEW ENGLAND DIVISION  
150 CAUSEWAY STREET  
BOSTON 14, MASS.

NEDGW

26 June 1956

SUBJECT: Survey of Greenwich Cove, Connecticut

TO: Chief of Engineers, Department of the Army, Washington 25, D.C.

AUTHORITY

1. This report of survey of Greenwich Cove, Connecticut is submitted in compliance with an item in Section 7 of the River and Harbor Act approved July 24, 1946 which reads as follows:

"The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys to be made at ....  
.... Greenwich Cove, Connecticut....."

2. A favorable preliminary examination report was submitted by the Division Engineer on April 11, 1947, and reviewed by the Chief of Engineers and the Board of Engineers for Rivers and Harbors. A survey to determine the advisability and cost of improvement and the local cooperation required was recommended by the Board of Engineers for Rivers and Harbors on May 20, 1947.

SCOPE OF SURVEY

3. A study of survey scope was authorized by the Chief of Engineers on May 23, 1947.

4. For this report, a detailed hydrographic survey consisting of soundings and probings was made to determine the character and volume of materials to be dredged. Available maps and data were also used. A public hearing was held at Greenwich on December 6, 1946, during the preliminary examination, to enable local interests to submit their desires. Since then the City officials and local recreational interests have been further consulted and all additions or changes in improvements requested have been considered in this report.

## DESCRIPTION

5. Greenwich Cove is one of 5 harbors in the Town of Greenwich, Connecticut near the western end of Long Island Sound. It is about 30 miles northeast of New York City and about 2.5 miles west of Stamford Harbor, Connecticut. The 5 harbors in Greenwich open onto Captain Harbor, which is partially separated from Long Island Sound by the Captain Islands and by rocky reefs. Just west of Greenwich Cove is Cos Cob Harbor at the mouth of the Mianus River. Indian Harbor and Greenwich Harbor are two miles west of Greenwich Cove and Byram Harbor is about 3 miles west. There are Federal navigation projects which provide for a 6-foot channel in Mianus River and a 12-foot channel and 8 and 6-foot anchorages in Greenwich Harbor. There is no existing project at Greenwich Cove and no improvements for navigation have been made by local interests.

6. Greenwich Cove is generally shallow, the greater part being less than 6 feet deep. It varies in width from 2,000 feet at the entrance to 4,000 feet just inside the entrance, thence decreasing gradually to about 2,000 feet near the head of the cove about one mile from the entrance. Long Meadow Creek, which enters at the head of the Cove, is navigable at high tide to West End Avenue about 4,000 feet north of the Cove.

7. A natural channel about 500 feet wide with depths of 6 to 15 feet extends 3,000 feet into the Cove, terminating just north of Greenwich Island in the center of the Cove. The cove is almost completely landlocked and is protected on the south by a peninsula known as Greenwich Point. Prevailing winds are from the northeast to northwest in winter and from the south to southwest in summer.

8. No bridges cross Greenwich Cove or Long Meadow Creek below West End Avenue at the head of navigation. The Cove is tidal with practically no fresh water inflow. The mean range of tide is 7.2 feet and the spring range is 8.5 feet. Tidal currents are negligible inside the cove and do not exceed one knot at strength in the entrance.

9. The locality is shown on U. S. Coast and Geodetic Survey Charts Nos. 222 and 1213, and on the map accompanying this report.

## TRIBUTARY AREA

10. The area tributary to Greenwich Cove is the Town of Greenwich. The Old Greenwich and Riverside sections of the Town are immediately tributary on the east and west shores of the cove. The Town has a population of about 43,000 (1954 estimate) and a grand list for taxes of \$245,000,000 (1955 estimate). Although there is some truck gardening and light industry in the 48 square mile area of the Town, Greenwich is primarily an exclusive residential suburb of New York City.

11. The main line of the New York-New Haven and Hartford Railroad passes through the Town just above the head of navigation on Long Meadow Creek. The nearest railroad station is at Riverside, one mile northeast of Greenwich Cove. U. S. Route 1 (the Boston Post Road) crosses the town 1.5 miles north of the cove and the Merritt Parkway is about 6 miles north. The Greenwich-Killingly Expressway crossing the State is now being constructed near U. S. Route 1.

12. The shore around the northern half of the Cove is a residential area with many large homes. The western shore is zoned for single homes with acre or half-acre lots. Single homes with 12,000 square foot lots are permitted on the eastern shore of the cove, and on the western side of Long Meadow Creek. East of the Creek, near the Old Greenwich business center, single homes with 7,500 square foot lots are permitted. The shore around the southern half of the cove is occupied by Greenwich Point Park, a developed beach and recreational area open to Greenwich residents and maintained by the Town of Greenwich under the supervision of the Selectmen.

#### PRIOR REPORTS

13. The only prior report on Greenwich Cove was the preliminary examination submitted April 11, 1947. This report recommended that a survey be made to determine the extent and cost of such improvement as may be justified, and the proper basis for local cooperation to be required.

#### TERMINAL AND TRANSFER FACILITIES

14. There are no commercial terminal facilities in Greenwich Cove. There is one commercial boat yard, a town dock, and over 30 private docks. The boat yard is on the west side of Long Meadow Creek at the head of navigation. The facilities there include a marine supply store, a 2-ton boat lift, a marine railway for boats up to 40 feet, and a storage yard with space for about 50 boats. There is no water at this yard at low tide.

15. The Town of Greenwich maintains a pier in Greenwich Point Park just east of the entrance to the Cove. The pier is a timber pile, timber deck structure 6 feet wide that extends about 200 feet from shore, with a 16 x 20-foot landing float at the outer end. There is one to two feet of water at low tide at the float. The Town has also provided a light marine railway and a boat storage yard with space for about 30 boats near the entrance to the park. The Town dock and locker facilities there, and the boat storage yard, are supervised by a dockmaster employed by the town. The town also maintains boating facilities at the four other harbors in the town.

16. There are over 30 private docks and landings in Greenwich Cove, some of which are maintained by local resident associations. Most of these docks are not accessible at low tide, although a few owners have dredged channels and berths.

#### IMPROVEMENT DESIRED

17. A public hearing was held at Greenwich, Connecticut on December 6, 1946 for the preliminary examination. The hearing was well attended by State and local officials, representatives of local clubs and residential groups, business interests and citizens. The desired improvements consisted of an anchorage area 6 feet deep near Greenwich Point Park, a 6-foot channel 50 feet and 30 feet wide from the cove up Long Meadow Creek to West End Avenue, a 6-foot channel 50 feet wide east of Greenwich Island and a similar channel north of Greenwich Island to and through the neck connecting Greenwich Point Park to the mainland.

18. It was suggested that the dredged material be placed along the shore of the park and that the sand bar southeast of Pelican Island be built-up to reduce maintenance of the desired anchorage and provide additional protection. Spoil areas were offered along Long Meadow Creek. The First Selectman indicated that the Town could be expected to contribute a reasonable share of the cost of the improvement.

19. Local interests and officials were again consulted in 1956. The desired improvements were still substantially as requested at the hearing in 1946, although doubt was expressed as to the value of channels only 30 or 50 feet wide. It was stated that 75-foot channels are needed to permit two-way traffic and eliminate the danger of grounding. Local interests stated that use of the cove for recreational boating was limited by the lack of suitable anchorage area. Many of the boats of the existing fleet are aground at low tide and others are moored in the unprotected area east and north of Pelican Island.

20. It was stated that the other small boat areas in and near Greenwich are over crowded and that 50 to 75 craft now based in Byram and Greenwich Harbor would be transferred to Greenwich Cove if it was improved. Many larger craft that were moved from Greenwich Cove because of the lack of sheltered anchorage would be brought back. It was further stated that because of the improvement at least 100 new boats would be bought and based in the cove.

21. Objections were raised to the proposed channel through the neck near the entrance to Greenwich Point Park and to reducing the opening at the entrance of the cove. It was stated that the channel through the driftway would permit mud to work out of the cove and foul the bathing beach on the east side of the park. As this beach is a valuable asset to the town that is visited by 500,000 people each summer

it was felt it would be very undesirable to allow mud from the cove to spread along the beach. The objection to filling the gap between Pelican Island and Greenwich Point Park was made because it was stated that this would increase the velocity of the tide at the entrance of the cove. The pleasure boat fleet using the cove includes about 40 small sail boats which now have difficulty breasting the tide at the entrance. If the tide ran any faster these boats would be able to come and go through the entrance only on a slack or favorable current.

22. The channel to and up Long Meadow Creek was declared to be highly desirable because it would permit boats to reach the boat yard at any stage of tide as well as reducing the effect of effluent from the sewage disposal plant just above West End Avenue. Residents of Riverside and Old Greenwich stressed the need for a channel that would permit them and their children to use their boats without waiting for the tide. Local interests state that youngsters have misjudged the tide and been grounded by low water dangerously far from shore. The channel into Long Meadow Creek, it is said, would permit them to reach a safe landing near their homes.

#### COMMERCE

23. There is no commercial shipping in Greenwich Cove. Local interests have supplied information on the use of the cove by recreational craft. There were about 375 boats stored at Greenwich Cove in early 1956, including about 200 rowboats, 50 small outboard motor boats and 40 small sail boats. The small boats were stored along the shores of the cove and in the owner's yards. The 85 larger boats were divided between the town storage yard in Greenwich Point Park and the boat yard at the head of Long Meadow Creek. It was stated that there were at least 400 boats (including rowboats) based in the cove during the 1955 boating season.

24. In addition to the existing fleet based in the cove, the town officials indicated that 50 to 75 larger boats that have been kept at the Grass Island anchorage in Greenwich Harbor were moved to Greenwich Cove this spring. Although use of these craft will be somewhat limited because they will be able to approach the town pier only during higher stages of the tide and because they will have to anchor in the exposed area of Greenwich Cove, the owners will be better off than if they kept their boats at the now over-crowded Grass Island anchorage.

25. In addition to boats of the fleet based in the harbor, local interests report that some 10 to 20 transient boats are in the cove each weekend.

26. If the cove is improved there would undoubtedly be an increase in the number of boats based there. In addition to new boats purchased because of the improvement, boats would be transferred from other nearby



harbors for the convenience of the owners and because of over-crowding at their present location. It was also indicated that some of the larger craft that have been moved away from Greenwich Cove because of the lack of shelter would be returned.

#### VESSEL TRAFFIC

27. There are no records of vessel traffic in Greenwich Cove. Local interests have advised that the boats of the existing fleet are used almost every day during the boating season. The use of many of the boats is now limited to periods of high tide. A comparison with other harbors in Connecticut indicates that the larger craft are used about 4 days of each week of summer. The small sailboats may well be used almost every day.

#### DIFFICULTIES ATTENDING NAVIGATION

28. Navigation is now limited by low tide over a large part of the Cove. Provision of adequate anchorage area and channels to landing facilities would permit use of the Cove at times of low tide. Local interests have reported that small sailboats have difficulty breasting tidal currents at the entrance to the Cove. Filling the area between Pelican Island and Greenwich Point Park would further restrict tidal flow at the entrance and increase the velocity of the current.

#### WATER POWER AND OTHER SPECIAL SUBJECTS

29. The waterway is tidal and matters of water power and flood control are not pertinent to this report. Local interests have indicated that pollution is a problem in Long Meadow Creek and the Cove because of the sewage treatment plant just above the head of navigation. Town officials have stated that the waters of the Creek and Cove are safe for swimming and that the Town is in the process of making improvements to the treatment plant. The desired navigation channel up Long Meadow Creek would probably not have much effect on pollution although there might be a somewhat greater degree of dilution in the desired channel.

30. The disposal of dredged material on the east side of the Cove on the shore and on the tidal flat near the park would probably have little effect on fish and wildlife as there is considerable area of tidal flats and marshes in the Cove that would not be disturbed. Local interests have requested that spoil from the desired channel up Long Meadow Creek be used to improve marsh lands for residential use.

31. The U S. Department of Fish & Wildlife has been consulted on the effect of the desired improvements on fish and wildlife and has indicated that no significant damage to wildlife would result from the improvements.

## PLANS OF IMPROVEMENT

32. All the improvements desired by local interests have been considered during the preparation of this report. These improvements have been separated into three relatively independent improvements and are described below.

33. Greenwich Point Anchorage. - Consideration has been given to the provision of an anchorage for recreational craft in Greenwich Cove just north of Greenwich Point Park. The improvement would consist of a 30-acre anchorage and a 100-foot wide entrance channel, both 6 feet deep. The anchorage would extend easterly about 2,000 feet from the existing town dock to the location of a proposed town landing on a filled area near the park entrance. The entrance channel would extend about 800 feet from the anchorage to deeper water about 1,500 feet inside the entrance of the Cove.

34. Consideration was given to extending the west limit of the proposed anchorage to deeper water in the Cove. However, the additional area gained would be subject to wind and wave action from southwest storms. In 1946, local interests proposed constructing a jetty or placing fill between Pelican Island and the Greenwich Point shore to shelter this area and prevent shoaling caused by sand moving into the cove. In 1956, local interests objected to this proposal because it would reduce the size of the entrance to the cove, and increase the velocity of the tide. Local interests stated that small sailboats now have difficulty breasting the tide in the Cove entrance. A study of tidal currents at the Cove entrance indicates that the tide velocity would be increased from 10 to 15 percent if the opening between Pelican Island and the shore was closed. Because of the number of small sailboats now using the Cove it is not considered desirable to reduce the present opening.

35. Long Meadow Creek Channel. - Three alternative plans of improvement in Long Meadow Creek have been considered. Local interests desire a 6-foot deep channel from deeper water in the Cove about 6,700 feet up Long Meadow Creek to the head of navigation just below West End Avenue. A 75-foot wide channel has been considered as being desirable for navigation by the existing and prospective users. In view of the large amount of dredging required for the 75-foot channel an alternative channel 50 feet wide was also considered.

36. As the study progressed, it appeared that a major portion of the benefits from a channel up Long Meadow Creek could be obtained by improving the lower part of the Creek and a third alternative improvement was considered. This would consist of a 6-foot deep channel 75 feet wide and about 3,500 feet long from deeper water in Greenwich Cove into Long Meadow Creek, with a 6-foot deep 3-acre anchorage on the eastern side of the Creek at the head of this channel.

37. Other Channels. - The third improvement desired by local interests is a 6-foot deep channel from deeper water north of Greenwich Island in the center of the Cove about 3,000 feet long extending through the neck connecting Greenwich Point Park to the mainland to Long Island Sound, and an intersecting channel east of Greenwich Island about 1,500 feet long to the anchorage north of Greenwich Point Park. The channel to Long Island Sound would require dredging through the neck of Greenwich Point Park and the construction of a bridge for the roadway. This channel was desired in 1946 to reduce the rate of silting of the cove and permit a tidal inflow to reduce pollution in the cove. It is considered that this channel would also permit mud to work out of the Cove and down along the beach on the east side of the neck. As the problem to navigation caused by silting will be reduced by provision of more ample anchorage area it is considered that benefits from the cut through the neck would be outweighed by the cost of a bridge that would then be required and the probable adverse effect of mud on the beach and the effect of this cut-through on adjacent shores.

38. No further consideration has been given the channel through the neck. The western half of the desired channel and the connecting channel to the anchorage have been considered. This improvement consists of a 6-foot deep channel, 75 feet wide east of Greenwich Island from the east end of the anchorage about 1,500 feet northeasterly, then about 1,200 feet northwesterly to deeper water in the center of the Cove.

#### SHORE LINE EFFECTS

39. It is considered that dredging the desired anchorage and channels in Greenwich Cove would have very little effect on the adjacent shore lines except at the location of the proposed fill area. The desired channel up Long Meadow Creek would produce definite changes in the shore line along the creek. At one or two points, bulkheads or walls will be required. Local interests desire that spoil material be placed at certain points along the shore. The creek is now a meandering stream with very little water at low tide and the desired channel would be much wider and straighter. Some protection of the shore line will be required to reduce the erosion caused by the flow of the tide.

#### AIDS TO NAVIGATION

40. The United States Coast Guard has been consulted and has advised that additional aids to navigation will be required. The estimated first costs of additional navigation aids for the various plans of improvement are listed below:

<u>Improvement</u>	<u>Additional Aids</u>	<u>Estimated Cost</u>
Greenwich Point Anchorage	7 nun buoys	\$3,000
Long Meadow Creek Channel to West End Avenue	6 nun buoys and 6 can buoys	\$6,000
to 3-acre anchorage	7 nun buoys and 4 can buoys	\$5,500
Other Channels	4 can buoys	\$2,000

#### ESTIMATES OF FIRST COST

41. Estimates of first cost have been prepared for the three improvements considered in this report and the alternative plans studied. Probings were made in the hydrographic survey to determine the relative hardness of the material to be dredged and the existence and extent of submerged rock areas. There were no indications of rock in any of the areas considered and all proposed dredging would be of ordinary material, consisting of mud, sand and gravel. Dredging quantities are in terms of in-place measurement and provide for dredging to 6 feet plus an allowance of one foot for overdepth. Side slopes of 1 vertical on 3 horizontal were used. Unit prices are based on prices prevailing in March 1956 and on removal of material by contract dredging.

42. Greenwich Point Park Anchorage. - The costs for construction of a 30-acre anchorage and entrance channel to serve the needs of all the boats in the existing and reasonably prospective fleet at Greenwich Cove are estimated below:

Project Construction	
Dredging 30-acre anchorage and channel; 230,000 cy of ordinary material at \$1.40/cy	\$322,000
Contingencies	48,000
Engineering and Design	10,000
Supervision and Administration	35,000
Total	\$415,000
Other Construction	
Aids to Navigation	\$ 3,000
Public Landing	10,000
Dike for Fill	40,000
Total Estimated Project Cost	\$468,000

43. If the desired improvement in Long Meadow Creek is constructed, a 30-acre anchorage at Greenwich Point Park would be larger than necessary to serve the existing and prospective fleet. The costs for construction of a 27-acre anchorage and entrance channel are estimated below:

Project Construction

Dredging 27-acre anchorage and channel; 209,000 cy of ordinary material at \$1.40/cy	\$291,000
Contingencies	44,000
Engineering and Design	10,000
Supervision and Administration	<u>35,000</u>
Total	\$380,000

Other Construction

Aids to Navigation	3,000
Public Landing	10,000
Dike for Fill	<u>40,000</u>

Total Estimated Project Cost \$433,000

44. Long Meadow Creek Channel. - The costs for construction of three alternate improvements of Long Meadow Creek are estimated below. The most desirable improvement consists of a 75-foot wide channel 6 feet deep to the head of navigation at West End Avenue; one alternate consists of a similar channel 50 feet wide, and the second alternate consists of a 75-foot channel into the creek and a 3-acre anchorage in lieu of the remainder of the channel to West End Avenue.

	<u>75' Channel</u>	<u>50' Channel</u>	<u>75' Channel 3-Acre Anchorage</u>
Project Construction			
Dredging volume; ordinary material (cy)	231,000	130,000	125,000
Dredging cost @ \$1.40/cy	\$322,000	\$183,000	\$175,000
Contingencies	48,000	27,000	25,000
Engineering and Design	10,000	8,000	5,000
Supervision and Administration	<u>40,000</u>	<u>22,000</u>	<u>20,000</u>
	\$420,000	\$240,000	\$225,000
Other Construction			
Aids to Navigation	\$ 6,000	\$ 6,000	\$ 5,500
Public Landing	10,000	10,000	10,000
Bulkhead to Protect Shore	<u>29,000</u>	<u>19,000</u>	<u>4,000</u>
Total Estimated Project Cost	\$465,000	\$275,000	\$244,500

45. Other Channels. - The costs for the 75-foot wide, 6-foot deep channel from the Greenwich Point Park anchorage west and north of Greenwich Island, as considered in this report under other channels, are estimated below:

Project Construction	
Dredging 50,000 cy of ordinary material at \$1.40/cy	\$70,000
Contingencies	10,000
Engineering and Design	2,000
Supervision and Administration	<u>8,000</u>
	\$90,000
Other Construction	
Aids to Navigation	<u>2,000</u>
Total Estimated Project Cost	\$92,000

#### ESTIMATES OF ANNUAL CHARGES

46. The estimated annual carrying charges for the improvements considered in this report have been computed on an assumed life of 50 years and at an interest rate of 2.5 percent. The annual charges have been computed on the basis that local interests will contribute in cash a portion of the cost of the improvement and will provide suitable public landings and spoil disposal areas as required; the total costs to local interests to be commensurate with that portion of the benefits that are local in nature.

ESTIMATE OF ANNUAL CHARGES  
Greenwich Cove, Connecticut

	<u>Greenwich Point Park Anchorage</u>		<u>Long Meadow Creek</u>			<u>Other Channels</u>
	30 Acres	27 Acres	75 foot wide channel	50 foot wide channel	75 foot channel 3 Acre Basin	
<u>Federal Investment</u>						
Construction: Corps of Engineers	\$165,000	\$145,000	\$145,000	\$ 85,000	\$ 75,000	\$30,000
Navigation Aids: U.S. Coast Guard	3,000	3,000	6,000	6,000	5,500	2,000
Total	<u>\$168,000</u>	<u>\$148,000</u>	<u>\$151,000</u>	<u>\$ 91,000</u>	<u>\$ 80,500</u>	<u>\$32,000</u>
<u>Non-Federal Investment</u>						
Construction:	\$250,000	\$235,000	\$275,000	\$155,000	\$150,000	\$60,000
Public Landing	10,000	10,000	10,000	10,000	10,000	0
Dikes for fill or protect shore property	40,000	40,000	29,000	19,000	4,000	0
Total	<u>\$300,000</u>	<u>\$285,000</u>	<u>\$314,000</u>	<u>\$184,000</u>	<u>\$164,000</u>	<u>\$60,000</u>
<u>Federal Annual Carrying Charge</u>						
<u>Corps of Engineers:</u>						
Interest	\$ 4,100	\$ 3,600	\$ 3,600	\$ 2,100	\$ 1,900	\$ 800
Amortization	1,600	1,400	1,500	900	700	300
Maintenance	5,500	5,200	4,700	2,800	2,500	1,000
Total	<u>\$ 11,200</u>	<u>\$ 10,200</u>	<u>\$ 9,800</u>	<u>\$ 5,800</u>	<u>\$ 5,100</u>	<u>\$ 2,100</u>
<u>U. S. Coast Guard</u>						
Interest	\$ 75	\$ 75	\$ 150	\$ 150	\$ 140	\$ 50
Amortization	30	30	60	60	60	20
Maintenance	95	95	90	90	100	30
Total	<u>\$ 200</u>	<u>\$ 200</u>	<u>\$ 300</u>	<u>\$ 300</u>	<u>\$ 300</u>	<u>\$ 100</u>
<u>TOTAL FEDERAL ANNUAL CHARGE</u>	<u>\$ 11,400</u>	<u>\$ 10,400</u>	<u>\$ 10,100</u>	<u>\$ 6,100</u>	<u>\$ 5,400</u>	<u>\$ 2,200</u>

	<u>Greenwich Point Park Anchorage</u>		<u>Long Meadow Creek</u>			<u>Other Channels</u>
	30 Acres	27 Acres	75 foot wide channel	50 foot wide channel	75 foot channel 3 Acre Basin	
<u>Non-Federal Annual Carrying Charge</u>						
<u>Local Interests</u>						
Interest	\$ 7,600	\$ 7,100	\$ 7,900	\$ 4,600	\$ 4,100	\$ 1,500
Amortization	3,100	3,000	3,200	1,900	1,700	500
Maintenance	1,000	1,000	800	600	400	0
Total	<u>\$ 11,700</u>	<u>\$ 11,100</u>	<u>\$ 11,900</u>	<u>\$ 7,100</u>	<u>\$ 6,200</u>	<u>\$ 2,000</u>
<u>TOTAL ANNUAL CARRYING CHARGES</u>	\$ 23,100	\$ 21,500	\$ 22,000	\$ 13,200	\$ 11,600	\$ 4,200



### ESTIMATES OF BENEFITS

47. Benefits have been estimated for the improvement of Greenwich Cove for recreational craft by construction of 6 foot deep channels and anchorages. Because of the effect the various improvements would have upon each other, benefits are first estimated for the Greenwich Point Anchorage of 30 acres, and then modified to determine the benefits from the Long Meadow Creek Channel.

48. Greenwich Point Anchorage. - The fleet based in Greenwich Cove, including craft transferred there in the spring of 1956, is estimated at 225 craft, not including about 200 row boats. An evaluation of this fleet based on data provided by local interests indicates a total present value of almost \$500,000. Comparison with other available data indicates that the values furnished by local interests are reasonable. The present values of craft in the existing fleet ranges from \$200 for small outboards to \$18,000 for an auxiliary sloop. Slightly more than half of the fleet consists of cruisers, auxiliary sailboats and sailboats that range in length from 18 to 42 feet.

49. Construction of the 30 acre anchorage will provide a benefit to this fleet, estimated to be a part of the annual net return of the boats to their owners. The annual net return to the owners has been taken as the amount the owners would receive if they chartered their boats to others, this amount having been computed at various percentages of the investment value for various types of boats, in accordance with available studies of boating practice. The composition of the existing fleet, the estimated total present value for each type, the percentage value taken as a reasonable annual return on a for-hire basis, and the annual net return by type are tabulated below.

Type of Craft	Number in Fleet	Length (feet)	Present Value	Annual Net Return to Owners	
				Percent	Value
Cruisers	39	18-42	\$145,000	9	\$13,000
Auxiliary Sail	27	20-42	200,000	9	18,000
Sail	63	20-34	110,000	12	13,200
Inboards	6	17-25	10,000	10	1,000
Small Sail	40	10-20	12,000	12	1,400
Small Outboards	<u>50</u>	<u>10-20</u>	<u>10,000</u>	<u>10</u>	<u>1,000</u>
	225		\$487,000		\$47,600

50. The total annual net return which can accrue to the existing fleet is about \$48,000. However, present conditions in Greenwich Cove limit the use of the existing fleet, depending on the height of the tide, and the owners do not receive this return. Part of the fleet is now moored in the deeper areas of the cove where they are available for use

at all stages of the tide, but are subject to storm damage and, at low tide, the owners have difficulty reaching their craft and navigating through the congested anchorage. The major portion of the fleet cannot be used at low tide because these boats are kept on the mud flats around the cove and in Long Meadow Creek. Boats can be brought to the boatyard at the head of the creek only at high tide.

51. It is estimated that the average boat in the fleet can now be used about 75 percent of the time and the owners actually receive about 75 percent of the annual return. The benefit to the existing fleet from construction of the 30-acre Greenwich Point Park has been evaluated at 25 percent of the possible annual net return to the owners of the fleet, or \$12,000.

52. In addition to this benefit it is considered that the provision of safe anchorage area in Greenwich Cove will induce the transfer of 35 craft from other nearby harbors, particularly those in Greenwich which are now overcrowded. Local interests have also indicated that some craft which were based at Greenwich Cove in the past but were moved to safer harbors, will be returned if safe anchorage area is available. The estimated number of craft to be transferred to Greenwich Cove after construction of the improvement, together with other data and the net annual return by type is tabulated below.

Type of Craft	Number Transferred	Length (feet)	Present Value	Annual Net Return to Owners	
				Percent	Value
Cruisers	10	18-42	\$ 37,000	9	\$ 3,300
Auxiliary Sail	7	20-42	49,000	9	4,400
Sail	17	20-34	30,000	12	3,600
Inboards	<u>1</u>	17-25	<u>1,700</u>	10	<u>200</u>
	35		\$117,700		\$11,500

53. The total annual net return which can accrue to the owners of craft that will be transferred to Greenwich Cove following improvement is about \$12,000. It is estimated that the owners of these craft now receive only 85 percent of the possible return because their craft are now based at inconvenient and congested harbors. The transfer of these craft will result in the owners enjoying 95 percent of the possible return from their craft, a benefit to the improvement of 10 percent of the net annual return, or \$1,200.

54. It is considered that construction of the anchorage and landing facilities in Greenwich Cove will induce the purchase of 40 new boats, of which 20 would be the smaller sail boats and outboards similar to those that now make up slightly over half of the existing fleet. The estimated number of each type of new boats, with the average depreciated value and the net annual return on a for-hire basis is tabulated below.

Type of Craft	Number of New Boats	Length (feet)	Average Depreciated Value	Annual Net Return to Owners	
				Percent	Value
Cruisers	7	18-42	\$ 82,000	10	\$ 7,400
Auxiliary Sail	3	20-42	27,000	9	2,400
Sail	9	20-34	22,500	12	2,700
Inboards	1	17-25	2,000	10	200
Small Sail	10	10-20	5,000	12	600
Small Outboards	<u>10</u>	<u>10-20</u>	<u>5,000</u>	<u>10</u>	<u>500</u>
	40		\$143,500		\$13,800

55. Inasmuch as the owners would receive the entire annual return from these craft, and will receive nothing if the improvement is not constructed, the benefit to the improvement is evaluated as the full annual return, or \$13,800.

56. It is considered that benefits from reduction of storm damage to the existing fleet would not be very large. No specific damage was reported by local interests and it appears that boats are now moved to safe locations when storms are expected. The owners would receive more use from their craft if safe anchorage were available but benefits from this have been evaluated above as part of the increased availability of the existing fleet.

57. There would be an additional benefit to the improvement from the use of material dredged from the anchorage for land enhancement. The Town of Greenwich has requested that dredged material be used to provide land for use as automobile parking area adjacent to the anchorage and the town beach. It is estimated that about 8 acres of tidal land would be filled, and that the new land as the property of the town will have a value of about \$2,000 an acre. The annual value of this land, and the evaluated benefit to the improvement is estimated at 5 percent of the total value, or \$800. It does not appear practicable to make a similar improvement with material dredged during future maintenance and provide land enhancement benefits.

58. The total evaluated benefits from the construction of a 30-acre anchorage near Greenwich Point Park, with an entrance channel and public landing, are as follows:

Benefit to existing fleet from increased use	\$12,000
Benefit to boats transferred	1,200
Benefit to additional new boats	13,800
Benefit from land enhancement	<u>800</u>
Total evaluated benefits	\$27,800

59. The benefit to recreational craft is considered to be 50 percent local and 50 percent general in nature. The benefit from land enhancement is considered to be purely local in nature. The total evaluated benefits are therefore 51 percent (\$14,300) local in nature and 49 percent (\$13,500) general in nature.

60. Long Meadow Creek. - Benefits from the improvement of Long Meadow Creek would accrue from the increased availability of the boats based near the head of the cove and on the creek. There would also be a benefit from the increased accessibility of the boat yard near West End Avenue, which can now be reached only at high tide through a tortuous channel.

61. It is considered that about 10 percent of the boat owners that would use the Greenwich Point Anchorage if Long Meadow Creek was not improved would prefer to keep their boats nearer their homes on Long Meadow Creek. Therefore, if both improvements were constructed, about 10 percent (or \$2,700) of the annual benefits to small craft computed for the 30-acre Greenwich Point Anchorage would accrue to the Long Meadow Creek improvement. As these benefits are from about 30 boats, the size of the Greenwich Point Anchorage could be reduced to about 27 acres for which the annual benefits would be about \$25,100.

62. A further benefit would obtain from the plans that would provide access to the boat yard at West End Avenue. The owner of the yard indicated that his yard was now filled to capacity and that even if the creek were improved he would not be able to expand his business. However, the craft currently using his yard are subject to delays and inconveniences. No precise information is available as to the value of these delays, but the benefits to owners of craft using the boat yard are estimated to be on the order of \$3,000.

63. Local interests indicated a desire that material dredged from Long Meadow Creek be used to fill adjacent marsh lands for use as residential property. It is estimated that the 75-foot channel to West End Avenue would provide fill for about 15 acres of land and that the two alternate Long Meadow Creek improvements would provide fill for about 8 acres. This use of spoil would increase the value of the land for residential purposes about \$1,000 per acre. The annual value of this land, and the evaluated benefit to the improvement is estimated at 5 percent of the total increase in value. The benefit to the 75-foot channel to West End Avenue is therefore about \$800 and the benefit to the two alternate improvements is \$400. It does not appear practicable to spoil material dredged during future maintenance so as to provide land enhancement benefits.

64. Benefits from the improvement of Long Meadow Creek by any of three alternate plans are summarized below:

Benefit:	75 foot channel to West End Ave.	50 foot channel to West End Ave.	75 foot channel to 3 Acre Anchorage
From craft that would use Greenwich Point Anchorage if Long Meadow Creek was not improved	\$2,700	\$2,700	\$2,700
From increased accessibility of boat yard at West End Avenue	3,000	3,000	0
From land enhancement	<u>800</u>	<u>800</u>	<u>400</u>
Totals	\$6,500	\$6,500	\$3,100

Because benefits to recreational boating are considered to be 50 percent local and 50 percent general in nature while benefits from land enhancement are completely local in nature, the total benefits from either of the Long Meadow Creek channels to West End Avenue are about 55 percent (\$3,650) local and 45 percent (\$2,850) general in nature. Benefits to the shorter channel and 3 acre anchorage are about 55 percent (\$1,750) local and 45 percent (\$1,350) general in nature.

66. Other Channels. - The channel from the east end of Greenwich Point Anchorage north and west to the center of the cove would provide a second entrance to the anchorage and improve the access to a few private docks. This channel could also be used during low tide periods as the back legs of a circular race course for small boats in the protected area of the cove. The annual value of these benefits has not been determined but it is very doubtful if they would be very large. For the purposes of cost allocation benefits from this channel have been assumed to be 50 percent local in nature.

#### COMPARISON OF BENEFITS AND COSTS

67. The following tabulation presents the estimated annual benefits and annual costs and shows the benefit-cost ratios for the various plans of improvement considered in this report. It will be noted that the only improvement that shows a favorable benefit-cost ratio is the Greenwich Point Anchorage. Although benefits for the channel east of Greenwich Island have not been evaluated it is considered that the benefit-cost ratio for this channel would be less than 0.5.

	<u>Annual Benefits</u>	<u>Annual Costs</u>	<u>Benefit- Cost Ratio</u>
<u>Greenwich Point Anchorage</u>			
If Long Meadow Creek is not improved	\$27,800	\$23,100	1.20
If Long Meadow Creek is also improved	25,100	21,500	1.17
<u>Long Meadow Creek Alternates</u>			
75 feet wide to West End Avenue	6,500	22,000	0.3
50 feet wide to West End Avenue	6,500	13,200	0.5
75 feet wide to 3-acre anchorage	3,100	11,600	0.3
<u>Other Channels</u>			
Channel east of Greenwich I.	--	4,200	---

#### PROPOSED LOCAL COOPERATION

68. The benefits to be derived from improvements of Greenwich Cove are principally recreational benefits that are 50 percent general and 50 percent local in nature. Benefits from land enhancement are purely local in nature. It is considered that local interests should bear a share of the project cost (exclusive of aids to navigation) commensurate with that portion of benefits that are local in nature. Local interests would therefore be required to make a cash contribution of 60 percent of the dredging cost for the Greenwich Point Anchorage, now estimated to be \$250,000.

69. In addition to a cash contribution toward the dredging cost of the anchorage and entrance channel, local interests should be required to furnish suitable public landing facilities open to all on equal terms, and construct the dikes or bulkheads to retain the dredged material used to make land for the public landing. Plans for these facilities should be approved by the Chief of Engineers prior to construction. The cost of these works is estimated at \$50,000.

70. Local interests should also be required to agree to hold and save the United States free from damages that may result from construction and maintenance of the improvements, and provide without cost to the United States all lands, easements, and rights-of-way necessary for the construction of the improvements and for subsequent maintenance, when and as required.

71. Similar requirements of local cooperation would also be required for the other improvements considered in this report, if they were to be constructed.

72. Officials of the Town of Greenwich have been consulted and have indicated that although the Greenwich Point Anchorage is very desirable, the Town would not approve opening any part of Greenwich Point Park to the general public to provide a public landing. There is no other available location for a public landing near the anchorage. In addition, the Town of Greenwich is not at present willing to provide the cash contribution and facilities that are estimated at \$300,000.

#### ALLOCATION OF COSTS

73. An allocation of costs between the United States and local interests is made so that the Federal and non-Federal annual carrying charges (exclusive of aids to navigation, which are considered to be wholly a Federal responsibility) are in the same ratio as the evaluated general and local benefits. The allocation of costs for the 30-Acre Greenwich Point Anchorage is shown below:

<u>Evaluated Benefits</u>		<u>Percent of Total</u>	<u>Annual Charges</u>
General	\$13,500	49 United States	\$11,200
Local	<u>\$14,300</u>	<u>51</u> Local Interests	<u>\$11,700</u>
	\$27,800	100	\$22,900

74. The annual carrying charge allocated to local interests includes an allowance of \$1,000 for maintenance of the public landing and \$10,700 for interest and amortization charges. On the basis of a 50-year life for the improvement and an interest rate of 2.5 percent, the interest and amortization charges represent an initial investment of about \$300,000 to be allocated to local interests, of this amount \$10,000 is the estimated cost of the public landing facilities and \$40,000 is the estimated cost of dikes for spoil areas to be constructed by local interests. The remaining \$250,000 is about 60 percent of the cost of dredging the anchorage and entrance channel. Therefore, 60 percent of the cost of dredging, to be done by the United States, is allocated to local interests.

75. Cost allocations have been made in a similar manner for the other improvements considered in this report as shown in the tabulation below:

COST ALLOCATIONS	Greenwich Point Anchorage 27 Acres	Long Meadow Creek			Other Channels
		75 feet wide	50 feet wide	75 feet to 3 Acre Anchorage	
Total Benefits	\$ 25,100	\$ 6,500	\$ 6,500	\$ 3,100	--
Local Benefits	12,950	3,650	3,650	1,750	--
Percentage of Local to Total	52%	55%	55%	55%	50%
Total Annual Charges (Not including navigation aids)	21,300	21,700	12,900	11,300	\$ 4,100
Amount Allocated to Local Interests	11,100	11,900	7,100	6,200	2,050
Less Maintenance Charges to Local Interests	1,000	800	600	400	0
Remainder for Interest and Amortization	\$ 10,100	\$ 11,100	\$ 6,500	\$ 5,800	\$ 2,050
Initial Investment Represented by Above	\$285,000	\$314,000	\$184,000	\$164,000	\$60,000
Less Costs for Work by Local Interests:					
Public Landing Facilities	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	0
Dikes for Landing and Shore Protection	40,000	29,000	19,000	4,000	0
Remainder: That portion of cost of work by United States allocated to local interests	\$235,000	\$275,000	\$155,000	\$150,000	\$60,000
Total Cost of Dredging	\$380,000	\$420,000	\$240,000	\$225,000	\$90,000
Percentage Allocated to Local Interests	60%	65%	65%	65%	65%



## COORDINATION WITH OTHER AGENCIES

76. All Federal, State and local agencies having interest in the improvement of Greenwich Cove were notified of the public hearing held at Greenwich, Connecticut, on December 6, 1946. Representatives and officials of the Town of Greenwich, other local interests, the U. S. Fish and Wildlife Service, and the U. S. Coast Guard have all been consulted during the study concerning the effects of the proposed improvements on their activities.

## DISCUSSION

77. Greenwich Cove, in the Town of Greenwich, Connecticut on the north shore of Long Island Sound about 30 miles northeast of New York City, is a small natural harbor that is extensively used for recreational boating. The Cove is about one mile long and 1/2 mile wide at low water. A natural channel about 500 feet wide with depths from 6 to 15 feet, extends into the center of the Cove.

78. There have been no improvements for general navigation in Greenwich Cove, with the exception of the landing facilities maintained by the Town on the south shore, just inside the entrance. Private interests have constructed docks and landings and, in a few cases, dredged berths and short approach channels.

79. The existing and reasonably prospective fleet would consist of about 300 recreational craft, not including rowboats, if the cove was improved. The size and use of the existing fleet is now limited by low tides and a lack of anchorage area in effective depths. Local interests desire construction of an anchorage area near Greenwich Point Park and various channels to permit full use of the recreational possibilities of the Cove.

80. Of the several improvements desired by local interests and considered in this report, only one would provide benefits greater than the annual carrying charges. The Greenwich Point Anchorage, in the sheltered bight just north of Greenwich Point Park, would provide safe anchorage for the craft in the existing and prospective recreational fleet. A 30-acre anchorage with a 100-foot wide entrance channel, both 6 feet deep at mean low water, and with public landing facilities on a filled area near the entrance of the park would have a total project cost of about \$468,000. With annual charges of about \$23,100 and benefits of \$27,800 this improvement would have a benefit-cost ratio of 1.2 to 1.

81. The Greenwich Point Anchorage would permit owners of the 225 recreational craft now based in the cove to keep their boats in a safe anchorage that is readily accessible from shore where they can be used at all stages of the tide. It is anticipated that owners of about 35 craft now based in other harbors in Greenwich, which have become

overcrowded, would transfer their boats to the Cove. It is estimated that 40 new boats would be purchased as a result of the improvement.

82. As the benefits to the recreational craft that will use the anchorage are considered to be 50 percent local and 50 percent general in nature and as the benefits from land enhancement from spoil disposal are completely local in nature, local interests should contribute to the cost of the improvement. In addition to the cost of public landing facilities estimated at \$10,000 and dikes to contain fill for parking near the landing estimated at \$40,000, local interests should be required to contribute in cash 60 percent of the cost of dredging to be done by the United States. This local cash contribution is now estimated at \$250,000.

83. The estimated cost of the Greenwich Point Anchorage to the Federal Government is \$165,000. In addition to the above costs, navigation aids to be installed and maintained by the United States Coast Guard are estimated to cost \$3,000.

84. Local officials have indicated that although the improvement is desirable and economically justified, the Town of Greenwich does not desire to permit access to the general public through Greenwich Point Park to a landing near the anchorage. Due to the financial situation at the moment the Town officials do not feel that the Town of Greenwich is in a position to provide the cash contribution and local construction.

85. Local interests also desired improvement of Long Meadow Creek north from deep water in the Cove to the head of navigation at West End Avenue. The Creek is dry at low tide with the exception of a few inches of fresh water runoff. Even at high tide when the controlling depth is about 5 feet at the head of navigation the stream is so winding that only experienced local boatmen can navigate it without grounding. The Creek is used by local residents who keep their boats on the mud flats near their homes for lack of suitable anchorage in Greenwich Cove and at the only boat yard in the Cove.

86. The boatyard, just below West End Avenue on the western bank of the Creek, is the only commercial establishment in Greenwich Cove. All of the shore of the Cove and Long Meadow Creek is zoned for residential use including the boatyard which exists only because it predates the zoning regulations. No expansion of the yard is possible under existing regulations and the owner has stated that his yard is now overcrowded.

87. Three alternate plans for the improvement of Long Meadow Creek have been considered in this report. None appear to have benefits larger than their annual costs. A channel 75 feet wide and 6 feet deep about 6,700 feet long to West End Avenue, considered as the most desirable for navigation, is estimated to cost about \$465,000 with annual charges of

\$22,000. A similar channel 50 feet wide, in which vessel traffic would be more subject to grounding, delays, and collision but which would have substantially the same benefits, is estimated to cost about \$275,000 with annual charges of \$13,200. The third alternate, a channel 75 feet wide and 6 feet deep only 3,700 feet long to and including a 3-acre anchorage in the creek which would not improve the access to the boat-yard is estimated to cost \$245,000 with annual charges of \$11,600.

88. A portion of the benefits to any improvement of Long Meadow Creek would accrue to boats that would use the Greenwich Point Anchorage if the Creek were not improved. Some owners would not use the Greenwich Point Anchorage but would receive a benefit from any of the Creek improvements. Owners of craft going to and from the boat yard would be benefited only if the channel were completed to the head of navigation. No benefit has been estimated to accrue to the boat yard owner as his business is limited by zoning regulations rather than a lack of customers.

89. Evaluated benefits for the channels to the head of the creek are \$6,500 yielding a benefit-cost ratio of 0.3 to 1 for the 75-foot wide channel and 0.5 to 1 for the 50-foot wide channel. No adjustment has been made for the additional difficulty of operation in the narrower channel. Benefits for the shorter channel and 3-acre anchorage are about \$3,100 yielding a benefit-cost ratio of 0.3 to 1. An allocation of cost made on the basis of the evaluated benefits indicates that local interests should be required to make a cash contribution of about 65 percent of the dredging costs of the improvement in addition to providing public landing facilities and works to protect adjacent shore properties.

90. In 1946, certain local interests desired construction of a channel from the center of Greenwich Cove through the neck connecting the park to the mainland. It was stated that the channel and opening would permit a tidal inflow that would reduce the rate of shoaling and the amount of pollution in the cove. Officials of the Town of Greenwich have indicated that pollution is not now a problem in Greenwich Cove although the scum from tidal marsh areas may sometimes be annoying to swimmers. It is further considered that an opening through the neck would permit mud to work out of the cove and down along the town beach. As this beach is visited by 500,000 people each summer it would not be desirable to permit such an occurrence.

91. As the benefits from the channel through the neck are doubtful and it is apparent that the expense of providing a bridge for highway traffic to the park would make the cost relatively high, no further consideration has been given to this improvement.

92. A channel from the center of the Cove to the east end of the Greenwich Point Anchorage was also considered. This channel, 6 feet deep, 75 feet wide and about 1,200 feet long is estimated to cost about \$92,000 with annual costs of \$4,200. The annual value of benefits from this improvement have not been determined but it is considered that they would not be sufficient to justify the improvement. The channel would provide better access to the private docks of a few property owners near the entrance of the park, and a second entrance channel to the anchorage. It would also provide a race course for small boats around Greenwich Cove. This may not be a benefit as these boats would be racing through the Greenwich Point Anchorage.

#### CONCLUSIONS

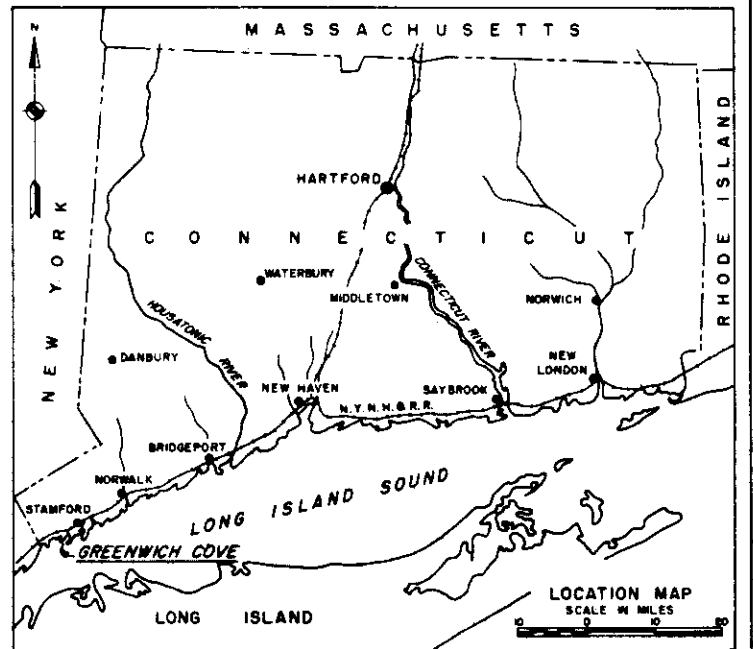
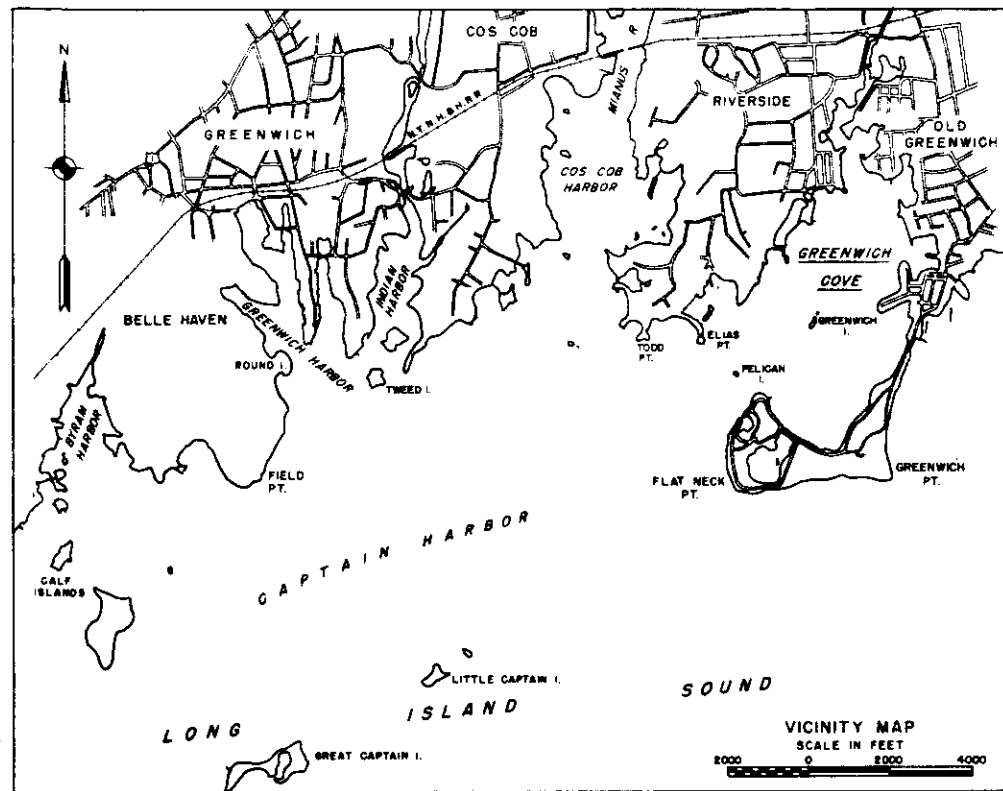
93. Although construction of a 30-acre anchorage, to a depth of 6 feet, near Greenwich Point Park to provide for the needs of recreational craft is economically justified, the people of the Town of Greenwich do not desire to permit access to the general public through Greenwich Point Park to a landing near the anchorage and the Town is not now in a position to assure the necessary cash contribution and local construction. It is therefore concluded that no Federal navigation project at Greenwich Cove should be authorized at this time.

#### RECOMMENDATION

94. It is recommended that no Federal navigation project be authorized at Greenwich Cove, Connecticut at this time.

Incl:.  
Map of Greenwich Cove

ROBERT J. FLEMING, JR.  
Brigadier General, U. S. Army  
Division Engineer

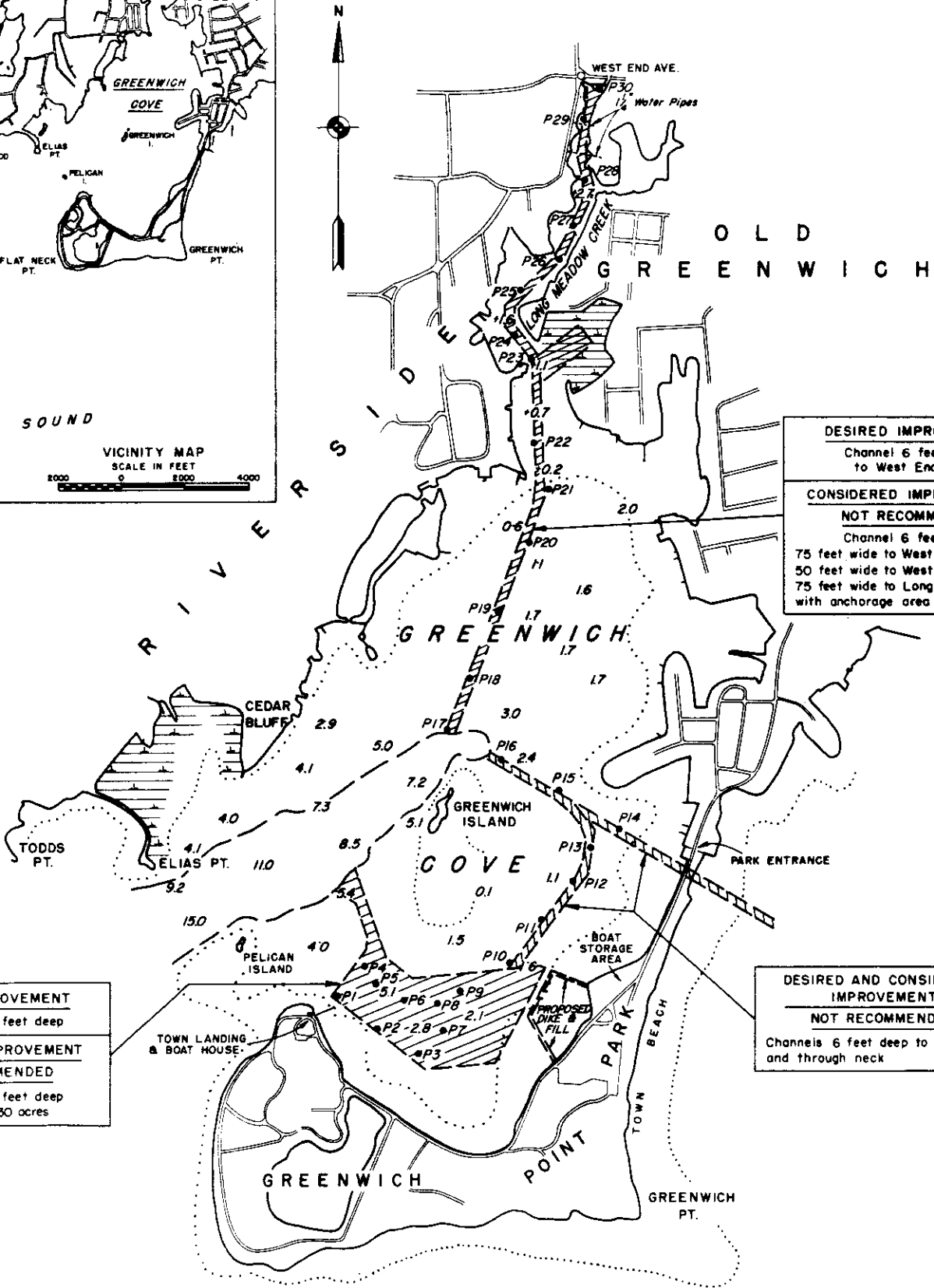


LIST OF PROBINGS					
NUMBER	DEPTH OF WATER	TOTAL DEPTH	MATERIAL	NUMBER	TOTAL DEPTH
1	3.4	13.6	Mud	16	4.8
2	3.0	9.6	3' Mud, sand to hardpan	17	5.2
3	2.3	11.7	Mud	18	3.0
4	3.7	9.9	Mud	19	1.8
5	4.5	10.3	Mud	20	0.5
6	5.2	10.2	Mud	21	+0.2
7	2.4	9.7	Mud	22	+0.6
8	2.9	12.1	Mud	23	+0.9
9	2.7	10.7	Mud	24	+1.3
10	1.9	10.9	Mud	25	+2.2
11	1.3	9.3	6' Mud, 2' Sand	26	+0.2
12	1.3	9.5	Mud	27	+7.2
13	1.4	9.5	Mud	28	+3.3
14	0.9	9.6	Mud	29	+3.3
15	2.0	10.1	Mud	30	+3.0

Probings are shown thus: P# and were made with a 3/4" steel pointed iron pipe forced down by 2 men.

**DESIRED IMPROVEMENT**  
Anchorage - 6 feet deep

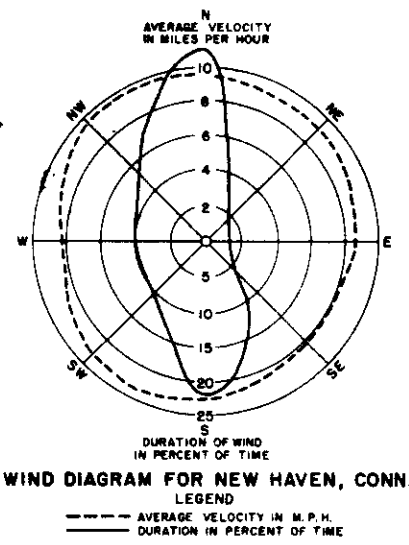
**CONSIDERED IMPROVEMENT**  
**NOT RECOMMENDED**  
Anchorage - 6 feet deep with area of 30 acres



**DESIRED IMPROVEMENT**  
Channel 6 feet deep to West End Ave.

**CONSIDERED IMPROVEMENTS**  
**NOT RECOMMENDED**  
Channel 6 feet deep 75 feet wide to West End Ave. 50 feet wide to West End Ave. 75 feet wide to Long Meadow Creek with anchorage area of 3 acres

**DESIRED AND CONSIDERED IMPROVEMENT**  
**NOT RECOMMENDED**  
Channels 6 feet deep to anchorage and through neck



**NOTES**  
Soundings and probings are in feet and tenths and are referred to the plane of Mean Low Water. Hydrography from survey of Oct. 3 - Nov. 10, 1949 by J. Day. Topography from maps of the Town of Greenwich.  
Low water line shown thus: ---  
6-foot depth contour shown thus: ---  
Desired Improvements shown thus: [hatched pattern]

**GREENWICH COVE CONNECTICUT**

IN 1 SHEET SCALE IN FEET 500 0 500 1000 1500

NEW ENGLAND DIVISION, BOSTON, MASS. JUNE 1956

APPROVED: [Signature] JUN 19 1956

SUBMITTED: [Signature] JUN 19 1956

TO ACCOMPANY SURVEY REPORT DATED JUNE 26, 1956

FILE NO. GH. 285